BROOKHAVEN NATIONAL LABORATORY

**Work Permit #** SDD-2016-004/SS-2016-
**Work Order #** ___
**Job#** ___ **Activity#** ___

*See "Instructions for Filling out the Work Permit" contained in the Work Planning and Control for Experiments and Operations Subject Area.*

**1. Work request WCC fills out this section.** ☐ **Standing Work Permit**

| | | | |
|---|---|---|---|
| Requester: Carter Biggs | Date: 7/20/2016 | Ext.: 7515 | Dept/Div/Group: PO/PHENIX |
| Other Contact person (if different from requester): Carter Biggs | | | Ext.: 5301 |
| Work Control Coordinator: Rob Pisani | | Start Date: 7/20/2016 | Est. End Date: 11/1/2016 |
| Brief Description of Work: Removal of PHENIX DC & PC1 detector subsystems (east and west) as part of the overall PHENIX Removal & Repurposing (R&R) plan | | | |
| Building: 1008 | Room: IR & AH | Equipment: PHENIX north and south DC's & PC1's | Service Provider: PHENIX Techs, Engineers & Subsystem Experts, PHENIX Electrician, C-A Carpenters and Riggers |

**2. WCC, Requester/Designee, Service Provider, and ESSH (as necessary) fill out this section or attach analysis**

**ESSH ANALYSIS**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Radiation Concerns** | ☐ None | ☒ Activation | ☐ Airborne | ☐ Contamination | ☐ Radiation | ☐ NORM | ☐ Other |
| ☐ Special nuclear materials involved, notify Isotope Special Materials Group | | | | ☐ Fissionable/Radiological materials involved, notify Laboratory Nuclear Safety Officer | | | |
| **Radiation Generating Devices:** | ☐ Radiography | ☐ MoistureDensityGauges | | ☐ Soil Density Gauges | | ☐ X-ray Equipment | |

| | | | | |
|---|---|---|---|---|
| **Safety and Security Concerns** | ☐ None | ☐ Explosives | ☐ Transport of Haz/Rad Material | ☐ Pressurized Systems |
| ☐ Adding/Removing Walls or Roofs | ☐ Critical Lift | ☐ Fumes/Mist/Dust* | ☐ Magnetic Fields* | ☐ Railroad Work |
| ☐ Asbestos* | ☐ Cryogenic | ☐ Heat/Cold Stress | ☐ Nanomaterials/particles* | ☒ Rigging |
| ☐ Beryllium* | ☐ Electrical | ☐ Hydraulic | ☐ Noise* | ☐ Silica* |
| ☐ Biohazard* | ☒ Elevated Work | ☐ Lasers* | ☐ Non-ionizing Radiation* | ☐ Security Concerns |
| ☐ Chemicals/Corrosives* | ☐ Excavation | ☐ Lead* | ☐ Oxygen Deficiency* | ☐ Suspect/Counterfeit Items |
| ☐ Confined Space* | ☐ Ergonomics* | ☐ Material Handling | ☐ Penetrating Fire Walls | ☐ Vacuum |
| Ladder Access Required: ☒ Portable Ladder ☐ Fixed Ladder– Status/Restrictions: | | | | |
| * Safety Health Rep. Review Required | ☐ Haz, Rad, Bio Material Exceed DOE 151.1-C Levels - Contact OEM | | | ☐ Other |

| | | | |
|---|---|---|---|
| **Environmental Concerns** | ☒ None | ☐ Work impacts Environmental Permit No. | |
| ☐ Atmospheric Discharges (rad/non-rad/GHG) | ☐ Land Use Institutional Controls | ☐ Soil Activation/contamination | ☐ Waste-Mixed |
| ☐ Chemical or Rad Material Storage or Use | ☐ Liquid Discharges | ☐ Waste-Clean | ☐ Waste-Radioactive |
| ☐ Cesspools (UIC) | ☐ PCB Management | ☐ Waste-Hazardous | ☐ Waste-Regulated Medical |
| ☐ High water/power consumption | ☐ Spill potential | ☐ Waste-Industrial | ☐ Historical Enviornmental Hazards |
| Waste disposition by: | | | ☐ Other |
| Pollution Prevention (P2)/Waste Minimization Opportunity: ☒ No ☐ Yes | | Environmental Preferable Products Available: ☒ No ☐ Yes | |

| | | | | |
|---|---|---|---|---|
| **FACILITY CONCERNS** | ☒ None | ☐ Intermittent Energy Release | | |
| ☐ Access/Egress Limitations | ☐ Electrical Noise | ☐ Potential to Cause a False Alarm | | ☐ Vibrations |
| ☐ Credited Controls (Use USI Process) | ☐ Impacts Facility Use Agreement | | ☐ Temperature Change | ☐ Other |
| ☐ Configuration Management | ☐ Maintenance Work on Ventilation Systems | | ☐ Utility Interruptions | |

**WORK CONTROLS**

**Work Practices**

| | | | | |
|---|---|---|---|---|
| ☐ None | ☐ Exhaust Ventilation | ☒ Lockout/Tagout | ☐ Spill Containment | ☐ Security (see Instruction Sheet) |
| ☒ Back-up Person/Watch | ☐ HP Coverage | ☐ Posting/Warning Signs | ☐ Time Limitation | ☐ Other |
| ☐ Barricades | ☐ IH Survey | ☐ Scaffolding-req's inspection | ☐ Warning Alarm (i.e. "high level") | ☐ Electrical Inspection Required |

**Personal Protective Equipment**

| | | | | | | |
|---|---|---|---|---|---|---|
| ☐ None | ☐ Ear Plugs | ☒ Gloves, as necessary | ☐ Lab Coat | ☒ Safety Glasses, where req'd | | |
| ☐ Coveralls | ☐ Ear Muffs | ☐ Goggles | ☐ Respirator* | ☐ Safety Harness | | |
| ☐ Disposable Clothing | ☐ Face Shield | ☒ Hard Hat, as req'd | ☐ Shoe Covers | ☒ Safety Shoes, as req'd | ☐ High visibility cloths/vest | ☐ Other |

**Permits Required** (Permits must be valid when job is scheduled.)

| | | |
|---|---|---|
| ☒ None | ☐ Cutting/Welding | ☐ Impair Fire Protection Systems |
| ☐ Concrete/Masonry Penetration | ☐ Digging/Core Drilling | ☐ Rad Work Permit-RWP No |
| ☐ Confined Space Entry | ☐ Electrical Working Hot | ☐ Other Confined Space 2A certification |

**Dosimetry/Monitoring**

| | | | |
|---|---|---|---|
| ☒ None | ☐ Heat Stress Monitor | ☐ Real Time Monitor | ☐ TLD |
| ☐ Air Effluent | ☐ Noise Survey/Dosimeter | ☐ Self-reading Pencil Dosimeter | ☐ Waste Characterization |
| ☐ Ground Water | ☐ $O_2$/Combustible Gas | ☐ Self-reading Digital Dosimeter | ☐ Other |
| ☐ Liquid Effluent | ☐ Passive Vapor Monitor | ☐ Sorbent Tube/Filter Pump | |

**Training Requirements** (List specific training requirements)

PHENIX Awareness, C-A Access, Working at heights, Electrical Safety I, LOTO as appropriate

| **Work screening has identified the following as the reason for permitted work:** | **When work is categorized as worker planned work and a permit is used only the following signatures are required: ( Although allowed, there is no need to use back of form)** |
|---|---|
| ☐ **ESSH** | WCC: Date: |
| ☐ **Complexity** | Service Provider: Date: |
| ☒ **Work Coordination** | Authorization to start: Date: |
| ☐ **Permit Not Required** (Sections 3 through 7 optional) | (Department/Division, or their equivalent, Sup/WCC/Designee) |

**3. Both work requester and service provider contribute to work plan (use attachments for detailed plans)**

| |
|---|
| **Work Plan** (procedures, timing, equipment, scheduling, coordination, notifications, and personnel availability need to be addressed in adequate detail): During the 2016 PHENIX R&R Shutdown, PHENIX will be performing R&R work to prepare for a new sPHENIX detector. As part of this effort, it is required that the DC and PC detector subsystems (east and west) be removed and disposed of safely at 1008. Most of this work will be worker planned work by skilled PHENIX technicians and appropriately trained BNL bargaining unit personnel. Details of the lifting procedure to remove the DC/PC1 assembly from the east and west carriages is attached. |
| Special Working Conditions Required (e.g., Industrial Hygiene hold points or other monitoring)<br>None |
| Notifications to operations and Operational Limits Requirements: None |
| Post Work Testing, Notification or Documentation Required: See Attached Plan |

| | |
|---|---|
| Job Safety Analysis Required: ☐ Yes ☒ No | Review Done: ☒ in series ☐ team |

**Reviewed by:** * Primary Reviewer signature (not required for Worker Planned Work) means that the Review Team members were appropriate for the work that was planned, the Team visited the job site, hazards and risks that could impact ESSH have been considered and controls established according to BNL requirements. In addition, this signature indicates that applicable JRAs, FRAs, as well as other planning documents have been reviewed and training requirements have been identified and recorded on this permit.

| Title | Name (print) | Signature | Life # | Date |
|---|---|---|---|---|
| ES&H Professional | | | | |
| F&O Facility Project Manager | | | | |
| Service Provider | | | | |
| Work Control Coordinator | Don Lynch | | 20146 | |
| Safety Health Representative | | | | |
| Research Space Manager | | | | |
| Other | | | | |
| Other | | | | |
| Required Walkdown Completed | | | | |
| *Primary Reviewer | | | | |

**4. Job site personnel (Supervisor and workers) fill out this section.**

Note: Signature indicates personnel performing work have read and understand the hazards and permit requirements (including any attachments) and all training required for this permit is current/complete. Job Supervisor/Contractor Supervisor signatures also includes verification that worker training required for this permit is current/complete.

| Job Supervisor: | | Contractor Supervisor: | |
|---|---|---|---|
| Workers: | Life#: | Workers : | Life#: |
| | | | |
| | | | |
| | | | |

Workers are encouraged to provide feedback on ESSH concerns or on ideas for improved job work flow. Use feedback form or space below.

**5. Department/Division, or their equivalent, Line Manager or Designee**

Conditions are appropriate to start work: (Permit has been reviewed, work controls are in place and site is ready for job.)

| Name: | Signature: | Life#: | Date: |
|---|---|---|---|
| | | | |

**6. Worker provides feedback.**

**Worker Feedback (use attached sheets as necessary)**

a) WCM/WCC: Are there any changes as a result of worker feedback? ☐ Yes ☐ No

Note: See Work Planning and Control for Experiments and Operations Subject Area section 2.6.

**7. Post Job Review/Closeout: Work Control Coordinator (authorizing dept.) checks quality of completed permit and ensures the work site is left in an acceptable condition. (WCC can delegate clean up of job site to work supervisor.)** The WCC ensures that the change process to update drawings, placards, postings, procedures, etc., is initiated, if necessary.

| Name: | Signature: | Life#: | Date: |
|---|---|---|---|
| Comments: | | | |

Work Plan Attachment, W.P.# SDD-2016-004
R*emoval and Repurposing of PHENIX DC and PC1 Assembly (east and west)*
PHENIX IR, Bldg 1008

## Introduction

Safe handling of the Drift Chamber (DC) and Pad Chamber (PC) Assembly while removing from the PHENIX Detector Carriage will eliminate danger to workers at Brookhaven National Laboratory (BNL). This procedure will provide detailed instructions for safe removal of the detector assembly from the PHENIX East and West Carriages (procedure is the same for both carriages).

## 1.0 Purpose & Scope

The purpose of this procedure is to provide directions for handling and removing the DC/PC Assembly. It applies to BNL personnel, outside contractors, contract labor and to personnel designated to operate equipment covered by this procedure.
Safety standards provided by BNL for Material Handling (1.6.0) and required training and certification (1.6.1) will apply. There are two parts to the procedure: The lift of the detector assembly off the Detector Carriage, and movement of the detector assembly from the assembly hall floor to the truck for disposition.

This procedure will be used for the removal of the two DC/PC assemblies: one on the East Carriage, and one on the West carriage.

Note that the DC/PC assembly weighs an estimated 3200-lbs., including the attached cables.

## 2.0 Responsibilities

2.1 All operations shall be performed under the direction of the PHENIX Experimental Hall "Person-in-Charge" or his designee.

2.2 Due to the component value, as well as the inherent personnel risk involved in handling such large objects, this procedure and all relevant BNL safety guidelines must be strictly adhered to. In accordance with BNL policy, any individual may cease operations if they in any way feel unsafe or if they believe unsafe procedures are being followed. Such a complaint shall be reviewed by the cognizant engineer, and if necessary, BNL ES & H Services.

## 3.0 Prerequisites

3.1 All personnel involved in this procedure shall wear hard hats.

3.2 Personnel involved in this procedure shall wear safety shoes.

## 4.0 Precautions

4.1 Visitors shall not be permitted in the PEH during these procedures.

4.2 Some operations will require personnel to work in close proximity to suspended loads. Do not permit yourself or anyone else to be positioned under the load.

## 5.0 Equi pment/Parts List

5.1 The following equipment, hardware, & parts are called for in various sections of this procedure:

*Equipment/Rigging Hardware:*

Slings (2): 20-ft.,6200-lb.capacity in vertical configuration 40-ton Assembly Hall crane
Chain Falls (2): rated at or above 3000Lb. each.

## 6.0 Preparations

***Note: All lifting hardware shall be checked for current inspection stickers and shall be visually inspected for defects prior to each lift. Any items found to have expired inspection tags or any evidence of physical degradation shall be immediately removed from service and replaced with conforming hardware of the same capacity***.

6.1 Disconnect all cables, gas, and water lines

6.2 “Pull” the DC detector out on its slides in the extended position and secure with clamps

6.3 Position a manlift to the south of the carriage and one to the north of the carriage.

## 7.0 Procedure

7.1 Rigging the Detector for removal

7.1.1 Attach one 20’ length chainfall to the front center lift point on the DC with the other end anchored on the ground to the west.

7.1.2 Attach a 20’ sling from the crane hook to the center lift point on the DC

7.1.3 Attach two 20’ slings to be used later to the crane hook as well, with taglines to control them while not in use

7.1.4 Take the slack out of the vertical sling. Remove the rear support pins of the DC. Pull tension carefully on the ground chainfall to shift the center of gravity of the DC so it can be lowered to a horizontal position.

7.1.5 Attach the two chainfalls already on the hook to the “lower” DC liftpoints. Take out the slack and balance the load until the remaining two support pins holding it to the carriage can be removed.

7.1.6 Crane the now free DC around the east carriage and on to the truck for removal (after successful activation check).

Work Plan Attachment, W.P.# SDD-2016-004
R*emoval and Repurposing of PHENIX DC and PC1 Assembly (east and west)*
PHENIX IR, Bldg 1008

DC Installation from 2001